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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,530	03/01/2004	Richard R. Selinger	227745	2730
23460	7590	01/30/2008	EXAMINER	
LEYDIG VOIT & MAYER, LTD.			VANOY, TIMOTHY C	
TWO PRUDENTIAL PLAZA, SUITE 4900			ART UNIT	PAPER NUMBER
180 NORTH STETSON AVENUE			1793	
CHICAGO, IL 60601-6731			MAIL DATE	DELIVERY MODE
			01/30/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/790,530	SELINGER ET AL.	
	Examiner	Art Unit	
	Timothy C. Vanoy	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-66 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) 17,19-21,23,24,26,27,33,34,52,53,55-58 and 60-66 is/are allowed.
- 6) Claim(s) 1-16,18,22,25,28-32,35-51,54 and 59 is/are rejected.
- 7) Claim(s) 32 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 01 March 2004 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date July 9, 2004; July 26, 2005.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application
- 6) Other: _____.

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement filed on July 9, 2004 does not fully comply with the requirements of 37 CFR 1.98(b) because the literature references denoted by document numbers "AM" and "AS" are missing their publication dates. Since the submission appears to be *bona fide*, Applicants are given **ONE (1) MONTH** from the date of this notice to supply the above mentioned omissions or corrections in the information disclosure statement. NO EXTENSION OF THIS TIME LIMIT MAY BE GRANTED UNDER EITHER 37 CFR 1.136(a) OR (b). Failure to timely comply with this notice will result in the above mentioned information disclosure statement being placed in the application file with the noncomplying information **not** being considered. See 37 CFR 1.97(i).

Specification

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract **not exceed 150 words in length** since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

In this application, the abstract exceeds 150 words and is (therefore) too long.

Claim Objections

- a) There are two claim 32s in this application. In correcting this deficiency by re-numbering the claims, the dependencies of the re-numbered claims should also be checked to make sure that they are also proper.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 14, 18, 22, 42, 54, and 59 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- a) Claims 14, 18, 22, 42, 54, and 59 recite the trademark "Flexsorb" which is used to describe a particular material or product, and this renders the claims indefinite: please note the discussion of the *Ex parte Simpson* 218 USPQ 1020 (Bd. App. 1982) decision set forth in section 2173.05(u) in the MPEP.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4, 5, 8, 9, 10, 13, 16, 25, 28-32, 35-38, 40, 41 and 45-51 are rejected under 35 U.S.C. 102(b) as being anticipated by U. S. Pat. 5,211,923 to Harkness et al.

The Harkness patent describes a method and apparatus for dissociating hydrogen sulfide into hydrogen gas and elemental sulfur, comprising:

feeding a sour gas stream into an "amine purification" unit, where (evidently) the amine purification unit separates the sour gas into a hydrogen sulfide-containing gas having a hydrogen sulfide concentration ranging from 30 to 99% and a residual gas;

feeding the hydrogen sulfide-containing gas into a microwave plasma reactor, where the microwaves dissociate the hydrogen sulfide into hydrogen gas and elemental sulfur (please see col. 3 Ins. 33-43);

separating hydrogen gas from the sulfur in a sulfur scrubber where the gases are sprayed with an overhead of liquid sulfur which acts to condense the sulfur in the gases into liquid sulfur that is removed at the bottom of the scrubber and produce an overhead gas comprising hydrogen sulfide and hydrogen gas which is removed from the scrubber (please see col. 3 Ins. 47-59);

feeding the hydrogen-containing gas into a "final purification step" (such as pressure absorption, membrane separation or the like) where hydrogen sulfide, hydrogen gas and any remaining impurities are separated into streams 42, 44 and 46.

The hydrogen sulfide stream is re-cycled to the feed stream for the plasma reactor while the hydrogen stream may be removed as a product (please see col. 4 Ins. 15-26).

Claim 1 in the Harkness patent reports that the plasma reactor may operate at a temperature ranging from 150 to 450 °C and at a pressure ranging from 0.5 to 2 atmospheres.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

The person having ordinary skill in the art has the capability of understanding the scientific and engineering principles applicable to the claimed invention. The references of record in this application reasonably reflect this level of skill.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-16, 25, 28-32 and 35-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Pat. 5,211,923 to Harkness et al. in view of the literature reference titled "Fuels Technologies FLEXSORB® SE FLEXSORB® SE PLUS Environmental Technology" obtained from http://www.prod.exxonmobil.com/refiningtechnologies/fuels/mn_flexsorb.html and also U. S. Pat. 5,681,540 to O'Brien.

The Harkness patent describes a method and apparatus for dissociating hydrogen sulfide into hydrogen gas and elemental sulfur, comprising:

feeding a sour gas stream into an "amine purification" unit, where (evidently) the amine purification unit separates the sour gas into a hydrogen sulfide-containing gas having a hydrogen sulfide concentration ranging from 30 to 99% and a residual gas;

feeding the hydrogen sulfide-containing gas into a microwave plasma reactor, where the microwaves dissociate the hydrogen sulfide into hydrogen gas and elemental sulfur (please see col. 3 Ins. 33-43);

separating hydrogen gas from the sulfur in a sulfur scrubber where the gases are sprayed with an overhead of liquid sulfur which acts to condense the sulfur in the gases into liquid sulfur that is removed at the bottom of the scrubber and produce an overhead

gas comprising hydrogen sulfide and hydrogen gas which is removed from the scrubber (please see col. 3 Ins. 47-59);

feeding the hydrogen-containing gas into a "final purification step" (such as pressure absorption, membrane separation or the like) where hydrogen sulfide, hydrogen gas and any remaining impurities are separated into streams 42, 44 and 46. The hydrogen sulfide stream is re-cycled to the feed stream for the plasma reactor while the hydrogen stream may be removed as a product (please see col. 4 Ins. 15-26).

Claim 1 in the Harkness patent reports that the plasma reactor may operate at a temperature ranging from 150 to 450 °C and at a pressure ranging from 0.5 to 2 atmospheres.

The Harkness et al. patent is submitted to render obvious the limitations of at least Applicants' claims 1, 2, 4, 5, 7, 8, 9, 10, 12, 13, 15, 16, 25, 28-32, 35-38, 40, 41, 43, 44 and 45-51.

The difference between the Applicants' claims and this Harkness et al. patent is that Applicants' claims 14 and 42 identify the amine reagent (used in the initial scrubbing step to separate the hydrogen sulfide from the rest of the feed gas) as "Flexsorb" (whereas the Harkness et al. patent does not identify the amine used in the "amine purification" step set forth in col. 3 ln. 34 in the Harkness et al. patent).

The "Flexsorb" literature reference describes "Flexsorb" as an amine that is a cost-effective way to selectively remove hydrogen sulfide from process gas streams, even in the presence of carbon dioxide. The "Flexsorb" technology is more efficient than

conventional amine gas treating, and can remove hydrogen sulfide to concentrations as low as 10 ppm.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the process described in the Harkness et al. patent by substituting the amine reagent that Harkness uses in his "amine purification" step set forth in col. 3 ln. 34 with the "Flexsorb" amine described in the "Flexsorb" literature reference, as set forth in at least Applicants' claims 14 and 42, because of the taught advantages of this "Flexsorb" amine reagent to selectively remove hydrogen sulfide from sour gases that may also contain carbon dioxide (which is not seen to be any different from the "sour gas" set forth in col. 3 ln. 33 in the Harkness et al. patent) to levels as low as 10 ppm. The "Flexsorb" literature reference suggests that the "Flexsorb" amine is superior to conventional amines for selectively sorbing hydrogen sulfide out of a gas.

The difference between the Applicants' claims and this Harkness et al. patent is that Applicants' claims 3, 6, 11 and 39 set forth that the temperature conditions in the plasma reactor ranges from 1,500 to 2,000 °C (whereas col. 3 Ins. 46-47 in the Harkness et al. patent sets forth that their plasma operates at 150 to 450 °C).

The O'Brien patent is drawn to the same art of dissociating hydrogen sulfide into elemental sulfur and hydrogen gas, wherein col. 1 ln. 64 to col. 2 ln. 3 in the O'Brien patent reports that the dissociation of hydrogen sulfide is not thermodynamically favorable until temperatures of 1,500 °C are reached and exceeded. Some dissociation occurs at lower temperatures but the rates are low and re-combination rates are rapid.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made *to have modified* the process described in the Harkness et al. patent *by elevating* the plasma temperature conditions from the temperature range of 150 to 450 °C reported in col. 3 Ins. 46-47 in the Harkness et al. patent to temperatures that meet or exceed 1,500 °C as taught in col. 1 ln. 64 to col. 2 ln. 3 in the O'Brien patent, as set forth in Applicants' claims 3, 6, 11 and 39, *because* of the taught advantages of such temperatures that meet or exceed 1,500 °C as being thermodynamically favorable *and also* avoiding the re-combination (of the hydrogen and the sulfur) that occurs at cooler temperatures (which include the 150 to 450 °C temperature range reported in col. 3 Ins. 46-47 in the Harkness et al. patent).

Claims 17-24, 26, 27, 33, 34 and 52-66 have not been rejected under either 35USC102 or 35USC103 because the limitations of these claims are not taught or suggested in U. S. Pat. 5,211,923 to Harkness et al. (or any of the other references of record).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy C. Vanoy whose telephone number is 571-272-8158. The examiner can normally be reached on Mon-Fri 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman, can be reached on 571-272-1358. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Timothy C Vanoy
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Primary Examiner
Art Unit 1793

tcv